

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-11 (Canceled)

Claim 12. (Previously Presented): A transfer apparatus for a semiconductor process, comprising:

an articulated arm unit attached to a support base to be stretchable/retractable within a horizontal plane, the articulated arm unit having a distal end arm which reciprocates in a first direction when the articulated arm unit stretches and retracts, the articulated arm unit being rotatable within a horizontal plane relative to the support base;

a support member arranged on the distal end arm to support a target substrate;

a pair of temporary shelves configured to support the target substrate, and disposed to sandwich the support member when the articulated arm unit retracts, the temporary shelves being arranged not to rotate together with the articulated arm unit;

a main driving mechanism configured to stretch/retract the articulated arm unit;

a rotational driving mechanism configured to rotate the articulated arm unit; and

a vertical driving mechanism configured to vertically drive the support member and the temporary shelves relative to each other in order to transfer the target substrate therebetween.

Claims 13-20 (Canceled)

Claim 21 (Previously Presented): A transfer apparatus for a semiconductor process, comprising:

an articulated arm unit attached to a support base to be stretchable/retractable within a horizontal plane, the articulated arm unit having a distal end arm which reciprocates in a first direction when the articulated arm unit stretches and retracts;

a support member arranged on the distal end arm to support a target substrate, the support member being attached to the distal end arm to be reciprocable in the first direction;

a main driving mechanism configured to stretch/retract the articulated arm unit;

a sub-driving mechanism configured to reciprocate the support member relative to the distal end arm;

said support member configured to reciprocate relative to the distal end arm while the articulated arm unit stretches and retracts;

said sub-driving mechanism mechanically connected to the main driving mechanism such that reciprocation of the support member is performed in accordance with stretching/retracting of the articulated arm unit; and

said sub-driving mechanism including,

a pair of sprockets axially supported by the distal end arm, and

a chain extending between the pair of sprockets, the chain being connected to the support member.

Claim 22 (Previously Presented): A transfer apparatus for a semiconductor process, comprising:

an articulated arm unit attached to a support base to be stretchable/retractable within a horizontal plane, the articulated arm unit having a distal end arm which reciprocates in a first direction when the articulated arm unit stretches and retracts;

a support member arranged on the distal end arm to support a target substrate, the support member being attached to the distal end arm to be reciprocable in the first direction;

a main driving mechanism configured to stretch/retract the articulated arm unit;

a sub-driving mechanism configured to reciprocate the support member relative to the distal end arm;

said support member configured to reciprocate relative to the distal end arm while the articulated arm unit stretches and retracts;

said sub-driving mechanism mechanically connected to the main driving mechanism such that reciprocation of the support member is performed in accordance with stretching/retracting of the articulated arm unit; and

said sub-driving mechanism connected to the main driving mechanism through a speed-increasing device.

Claim 23 (Previously Presented): A transfer apparatus for a semiconductor process, comprising:

an articulated arm unit attached to a support base to be stretchable/retractable within a horizontal plane, the articulated arm unit having a distal end arm which reciprocates in a first direction when the articulated arm unit stretches and retracts;

a support member arranged on the distal end arm to support a target substrate, the support member being attached to the distal end arm to be reciprocable in the first direction;

a main driving mechanism configured to stretch/retract the articulated arm unit;
a sub-driving mechanism configured to reciprocate the support member relative to the distal end arm and including,
a piston cylinder disposed on the distal end arm, and
a piston rod reciprocated by the piston cylinder, the piston rod being connected to the support member; and
a controller configured to drive the sub-driving mechanism independently of the main driving mechanism.

Claim 24 (Previously Presented): A transfer apparatus for a semiconductor process, comprising:

an articulated arm unit attached to a support base to be stretchable/retractable within a horizontal plane, the articulated arm unit having a distal end arm which reciprocates in a first direction when the articulated arm unit stretches and retracts;

a support member arranged on the distal end arm to support a target substrate, the support member being attached to the distal end arm to be reciprocable in the first direction;

a main driving mechanism configured to stretch/retract the articulated arm unit;

a sub-driving mechanism configured to reciprocate the support member relative to the distal end arm and including,

a ball screw disposed on the distal end arm to apply a rotational driving force to the ball screw, and

a ball nut engaging with the ball screw and connected to the support member; and

a controller configured to drive the sub-driving mechanism independently of the main driving mechanism.

Claim 25 (New): A semiconductor processing system comprising:

an airtight process chamber;

a worktable with a mount surface to support a target substrate disposed in the process chamber;

a supply system configured to supply a process gas into the process chamber;

an exhaust system configured to evacuate an interior of the process chamber by vacuum;

an airtight transfer chamber connected to the process chamber through a gate;

a transfer apparatus disposed in the transfer chamber to load/unload the target substrate into/from the process chamber, the transfer apparatus comprising,

an articulated arm unit attached to a support base to be stretchable/retractable within a horizontal plane, the articulated arm unit having a distal end arm which reciprocates in a first direction when the articulated arm unit stretches and retracts,

a support member arranged on the distal end arm to support the target substrate, the support member being attached to the distal end arm to be linearly reciprocatable relative to the distal end arm in the first direction,

a main driving mechanism configured to stretch/retract the articulated arm unit, and

a sub-driving mechanism configured to reciprocate the support member relative to the distal end arm;

a set of first lifters and a set of second lifters disposed to surround the worktable and configured to assist loading/unloading of the target substrate on/from the mount surface, the set of first lifters and the set of second lifters providing support levels at different heights for the target substrate; and

a lifter driving mechanism configured to vertically drive the first and second lifters relative to the worktable.

Claim 26 (New): The semiconductor processing system of Claim 25, wherein the transfer apparatus further comprises a pair of temporary shelves configured to support the target substrate, and disposed to sandwich the support member when the articulated arm unit and the support member retract, and a vertical driving mechanism configured to vertically drive the support member and the temporary shelves relative to each other in order to transfer the target substrate therebetween.

Claim 27 (New): The semiconductor processing system of Claim 25, further comprising:

a controller configured to drive the sub-driving mechanism independently of the main driving mechanism.

Claim 28 (New): A semiconductor processing system comprising:

an airtight process chamber;

a worktable with a mount surface to support a target substrate disposed in the process chamber;

a supply system configured to supply a process gas into the process chamber;

an exhaust system configured to evacuate an interior of the process chamber by vacuum;

an airtight transfer chamber connected to the process chamber through a gate;

a transfer apparatus disposed in the transfer chamber to load/unload the target substrate into/from the process chamber, the transfer apparatus comprising,

an articulated arm unit attached to a support base to be stretchable/retractable within a horizontal plane, the articulated arm unit having a distal end arm which reciprocates in a first direction when the articulated arm unit stretches and retracts,

a support member arranged on the distal end arm to support the target substrate, the support member being attached to the distal end arm to be linearly reciprocatable relative to the distal end arm in the first direction,

a main driving mechanism configured to stretch/retract the articulated arm unit, and

a sub-driving mechanism configured to reciprocate the support member relative to the distal end arm,

wherein the support member reciprocates relative to the distal end arm, while the articulated arm unit stretches and retracts.

Claim 29 (New): The semiconductor processing system of Claim 28, wherein transfer apparatus further comprises a pair of temporary shelves configured to support the target substrate, and disposed to sandwich the support member when the articulated arm unit and the support member retract, and a vertical driving mechanism configured to vertically drive the support member and the temporary shelves relative to each other in order to transfer the target substrate therebetween.

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Claim 30 (New): The semiconductor processing system of Claim 28, further comprising:

a set of first lifters and a set of second lifters disposed to surround the worktable and configured to assist loading/unloading of the target substrate on/from the mount surface, the set of first lifters and the set of second lifters providing support levels at different heights for the target substrate; and

a lifter driving mechanism configured to vertically drive the first and second lifters relative to the worktable.